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Douglas R. Bauder
Site Vice President & Station Manager
San Onofre Nuclear Generating Station

10 CFR 50.73(a)(2)(i)(B)
10 CFR 50.73(a)(2)(iv)(A)

November 1, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: **Docket Nos. 50-361 and 50-362**
LER 2011-002-00, Dual Unit Automatic Reactor Trip on High Pressurizer Pressure Due to Grid Disturbance
San Onofre Nuclear Generating Station (SONGS), Units 2 and 3

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2011-002-00, which is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(iv)(A).

This letter does not contain any commitments. If you have any questions regarding the attached report, please call Ryan Treadway at 949-368-9985.

Sincerely, for D. Bauder

Attachment: LER 2011-002-00

cc: E.E. Collins, Regional Administrator, NRC Region IV
R. Hall, NRC Project Manager, SONGS Units 2 and 3
G.G. Warnick, NRC Senior Resident Inspector, SONGS Units 2 and 3

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NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000361	1 of 4

4. TITLE

Dual Unit Automatic Reactor Trip on High Pressurizer Pressure Due to Grid Disturbance

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									SONGS Unit 3	05000362
09	08	2011	2011	002	00	11	01	2011	FACILITY NAME: N/A	DOCKET NUMBER: N/A

9. OPERATING MODE

1

10. POWER LEVEL

100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Douglas R. Bauder, Site Vice President and Station Manager	949-368-9275

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
		N/A					N/A		

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On 09/08/2011 at 1538 PDT, San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 were in Mode 1 operating at 100 percent power, when actuation of the Reactor Protection System occurred resulting in automatic reactor trips of both units. This event was caused by the loss of a 500 kV transmission line from Arizona to San Diego Gas and Electric (SDG&E) resulting in a cascading grid disturbance, automatic separation of the SDG&E and Southern California Edison (SCE) electrical systems, and collapse of the SDG&E grid voltage. The partial loss of external load caused increasing turbine speed, governor valve fast closure, a momentary reduction of heat removal from the reactor coolant system, and increasing pressure. Both reactors tripped on high pressurizer pressure followed by a turbine trip. All control rods inserted to shut down the reactors. Offsite power remained available from the SCE grid and emergency diesel generators were not required. Safety systems responded as designed. Both units were placed in a stable condition in Mode 3.

Loss of qualified offsite circuits required entry into Condition A of Technical Specification Limiting Condition for Operation (LCO) 3.8.1, with Required Action to verify remaining offsite circuits within one hour. This verification was performed approximately 1.5 hours late, which is a condition prohibited by TS.

A. REPORTABLE OCCURRENCE

On September 8, 2011, at 1538 hours Pacific Daylight Time (PDT), San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 experienced automatic reactor trips due to high pressurizer pressure caused by a grid disturbance and a partial loss of external load transient. A valid actuation of the Emergency Feedwater Actuation System (EFAS) [JE] due to low steam generator level also occurred during this event. Actuations of the Reactor Protection System (RPS) [JC] and the EFAS require a written report pursuant to 10 CFR 50.73(a)(2)(iv)(A). Within 4 hours of the dual unit trip, telephone notification was made to the NRC Emergency Notification System (ENS) as required by 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A).

In addition to the above, the grid disturbance on September 8, 2011, rendered one of two qualified offsite power sources inoperable for both Units 2 and 3. Loss of offsite circuits required entry into Condition A of Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1, with Required Action to verify remaining offsite circuits within one hour. The required action was performed approximately 1.5 hours late. This event is considered a condition prohibited by TS and requires a written report pursuant to 10CFR50.73(a)(2)(i)(B).

B. INITIAL CONDITIONS

At the time of the event on September 8, 2011, SONGS Units 2 and 3 were in Mode 1 with reactor power at approximately 100 percent power. There were no additional inoperable structures, systems, or components at the start of the event that contributed to this event.

C. DESCRIPTION OF OCCURRENCE

The offsite transmission network for SONGS consists of two physically and electrically independent 230 kV electrical transmission systems, provided by San Diego Gas and Electric (SDG&E) and Southern California Edison (SCE), interconnected in the SONGS switchyard by two circuit breakers (intertie). Either system, as well as the onsite emergency diesel generators, is capable of supplying the necessary power required for safe shutdown.

On September 8, 2011, work at an Arizona substation resulted in the loss of a single 500 kV transmission line from Arizona to the SDG&E grid. This caused a cascading grid disturbance, and for several minutes the SCE grid attempted to supply the demand associated with the increased power flow to SDG&E via the SONGS switchyard. Upon detecting a high current flow between the SDG&E and SCE electrical transmission systems at the SONGS switchyard, the automatic protective separation of the two systems occurred in the switchyard as designed. The opening of the SDG&E breakers resulted in a collapse of the SDG&E grid voltage. The SCE grid continued to provide offsite power to the Unit 2 and 3 Class 1E 4KV busses and station auxiliaries.

The following sequence of events is similar for both SONGS Units 2 and 3, differing by only seconds. The loss of the SDG&E load caused local grid frequency to the SONGS switchyard to increase, increasing turbine speed, and fast closing the main turbine governor valves in anticipation of a turbine overspeed.

This resulted in a momentary reduction of heat removal from the reactor coolant system, and increasing primary temperature and pressure. Pressurizer pressure increased to greater than the high pressurizer pressure RPS trip setpoint of 2375 psia, initiating a reactor trip followed by a turbine trip. All control rods inserted as required to shutdown the reactor. The EFAS, an Engineered Safety Features (ESF) system, initiated on low steam generator level and automatically started the auxiliary feedwater (AFW) pumps to supply water to all steam generators from the condensate storage tanks. When level was restored, EFAS was reset and AFW pumps were secured.

The reactor trips and recoveries for both units were uncomplicated. Offsite power remained available from the SCE grid, and emergency diesel generators were not required. The appropriate off-normal procedures were entered to mitigate the transient. Safety systems responded as designed. Both units were placed in a stable condition in Mode 3.

The opening of the SDG&E breakers resulted in a loss of one of the two qualified circuits between the offsite transmission network and the onsite Class 1E AC electrical power distribution system (for both Units 2 and 3). One required offsite circuit inoperable required entry into Condition A of TS LCO 3.8.1. The Required Action was to perform TS Surveillance Requirement 3.8.1.1, which is to verify correct breaker alignment and power availability for each remaining offsite circuit within one hour. This action was not performed within the allowed completion time, and consequently the LCO required action was not met. Condition F of TS LCO 3.8.1 required the plant to be in Mode 3 within 6 hours if Condition A required action was not met. Although the Condition A required action was not met, both reactors were already shutdown (in Mode 3) and offsite power remained available during the event, thereby satisfying Condition F required action. Therefore, there were no safety consequences.

D. APPARENT CAUSE

The cause of the grid disturbance originating in Arizona is being investigated by offsite agencies. The cause of the dual unit trip was an anticipated response to the external grid disturbance. The apparent cause of the late LCO action was primarily a legacy issue, in that, a loss of a single transmission system with system separation had not previously occurred, representing a new challenge to existing procedural guidance.

E. CORRECTIVE ACTIONS

Immediate/Interim Corrective Actions

- Both units were placed in a stable condition in Mode 3 following the dual unit trip. Trip recovery actions and post-trip reviews were completed. System responses were verified and system walkdowns confirmed equipment status. Within two hours of the grid disturbance, the SDG&E transmission system was restored and the offsite power feed was re-energized. Units 2 and 3 were restarted and synchronized to the grid within 65 and 87 hours, respectively.
- Upon discovery of the late TS LCO 3.8.1 action, the required verification was completed (within 2.5 hours of the dual unit trip). Within seven hours of the trip, the SDG&E offsite transmission circuit was declared operable, and the TS LCO was exited. Interim actions completed included procedure

revisions to clarify operator actions in response to inoperable offsite power sources or system separation.

Long Term Corrective Actions
The cause of the grid disturbance, and grid reliability and protection issues, are being investigated by off-site agencies. SCE/SONGS personnel are participating and providing information as requested. Lessons learned and additional actions will be addressed following the investigation.

F. SAFETY ASSESSMENT

No significant anomalies and no safety system functional failures occurred during this event. The reactor trips and trip recoveries were uncomplicated. All control rods inserted to shut down the reactors. Safety systems responded as designed to place and maintain the reactors in a safe shutdown condition. Offsite power remained available from the SCE grid and emergency diesel generators were not required. Therefore, the safety significance of this event is considered minimal.

G. ADDITIONAL INFORMATION

Previous Similar Events
SONGS has not previously experienced a dual unit trip, and there have been no reactor trips with the same underlying cause (i.e., grid disturbance, loss of a single transmission system). Within the past three years, there has been one reported occurrence of a missed/late TS LCO, but with a different underlying cause.